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THE EFFECT OF WHITE MULBERRY, *MORUS ALBA* L LEAF EXTRACT ON SOME CHARACTERISTICS OF THE COOLED SEMEN OF AWASSI RAMS

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ABSTRACT : In this study, the effect of adding different levels of mulberry *Morus alba* L leaf extract on some characteristics of the semen of Awassi rams after different periods of preservation was studied. The study was carried out in the animal field of the Department of Animal Production, College of Agriculture, University of Baghdad, Jadiriyah. The semen samples were divided equally into four concentrations in which gear diluent was used at a dilution ratio of 1:10. The concentrations of the control group (C) were left without addition, while the three concentrations were added to the *Morus alba* L leaf extract in the proportions (0.5, 1, 1.5%). The results of the study showed that adding cranberry leaf extract at a concentration of 0.5% led to a significant improvement (P<0.05) on sperm motility, plasma membrane integrity, mitochondrial activity and malonaldehyde concentration during different preservation periods. It can be concluded that adding *Morus alba* L leaf extract to a low concentration (Tris) diluent had an effective role in improving the studied semen characteristics of the sperm of Awassi rams.

Key words : White mulberry, *Morus alba* L, cooled semen, awassi rams.

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INTRODUCTION

Livestock production contributes significantly to providing food security at the economic level of the country due to the great importance of these products to the consumer (Arab Organization for Agricultural Development, 2001). Sheep constitute a large part of this wealth, as their numbers amounted to 6.780 million heads and constitute a major source of income for the population of pastoral areas in Iraq (FAO, 2003). In recent years, the use of medicinal plants has increased, perhaps the reason for this is due to the good effect of these plants in treating many cases, which led to the widespread use of them in a very wide way because they contain active ingredients with knowledge of how they work inside the body of the organism (Health Tools, 2005). Mulberry *Morus alba* L is a plant its leaves rich in effective natural antioxidants and phenolic compounds in protecting cells from free radicals in general and fatty acid peroxides (Andallu *et al*, 2014), several active compounds have been separated from the alcoholic extraction of *Morus alba* L leaves, such as quercetin and polyphenols, phenolic acids, and flavonoids (Katsube *et al*, 2006). The aim this research is to knowing the possibility of using mulberry leaf extraction to improving some characteristics of the semen of Awassi rams during preservation for different periods.

MATERIALS AND METHODS

The research was proceeded in sheep and goats field of the Department of Livestock Resources at the College of Agriculture, Baghdad University, Jadiriyah from the first of September 2018 to the end of November 2018. In this study five local Awassi rams were used for studying the influence of adding different concentrations of mulberry *Morus alba* L leaf extract on some studied characteristics of the semen of Awassi rams during cryopreservation periods.

Experimental animals and semen collection

In this experiment, five rams were used, who were trained for a month to collect semen using an artificial

Table 3 : Effect of different concentrations of mulberry *Morus alba* L leaf extraction on the concentration of malondialdehyde during (0 and 48 hours) of preservation.

Treatments	0 hour	48 hours
Control L	0.733 A	2.033 A
0.5	0.367 B	1.043 B
1	0.410 B	1.883 A
1.5	0.680 A	1.956 A
Mean	0.547	1.729
SEm	0.049	0.123
Significant	0.05	0.05

Table 4 : Effect of different concentrations of mulberry *Morus alba* L leaf extraction on the percentage of mitochondrial activity during (0 and 48 hours) of preservation.

Treatments	0 hour	48 hours
Control L	44.667 C	22.667 B
0.5	53.667 A	27.667 A
1	49.333 B	27.333 A
1.5	43.000 C	22.333 B
Mean	47.667	25
SEm	1.316	0.896
Significant	0.0001	0.01

time zero. At the time of 48 hours of preservation, the results of the experiment exhibited a significant ($P<0.05$) decrease in the concentration of malonaldehyde for Awassi rams at a concentration of 0.5% (1.043 µmol/10^9 sperm) compared to the other concentrations. The results showed that the mitochondrial activity of the sperms of 0.5% of *Morus alba* L leaf extract recorded the highest percentage (53%) and was significantly ($P < 0.05$) superior to the control treatment and the concentration of 1.5% (44.66 and 42.00%), respectively, for zero hours of preservation. While, the mitochondrial activity of sperms after 48 hours of preservation recorded the highest percentage of concentration 0.5 and 1% (27.66 and 27.33%), respectively incomparison with control treatment and concentration of 1.5% (22.66 and 22.33%), respectively (Table 4).

DISCUSSION

Recently, interest in antioxidants from natural sources has increased due to their ability to protect biological molecules, especially lipids, including cholesterol, unsaturated fatty acids and proteins, from oxidative damage (Bravo *et al*, 2013). The most important factors of low sperm motility are the changes that occur in the plasma membrane during the different preservation periods, is the release of energy enzymes, the most important of which is Glucose-6-phosphate dehydrogenase, which leads to a decrease in the production of the energy complex, adenosine triphosphate (ATP) and an increase in the proportion of AMP / ADP). (Manafi, 2011). In this study, a concentration of 0.5% the highest percentage of individual motility compared to other concentrations. The high content of flavonoids in cranberry leaf extract may have a role in protecting the sperm lipid membranes from oxidation by breaking the oxidation chain reaction (Choi and Hwang, 2005 and Shahid *et al*, 2012). The plasma membrane of ram sperm is rich in polyunsaturated fatty acids, which makes the sperm sensitive to oxidative stress (Griveau *et al*, 1995). Yokozawa *et al* (1998) showed in a study conducted on the effectiveness of flavonoids extracted from plants as antioxidants, that the hydroxyl groups present in flavonoid compounds with antioxidant activity are important in the process of inhibiting the activity of free radicals formed by cell self-oxidation. Thus, curbing these free radicals leads to preventing the formation of peroxides which may cause oxidation or destroying the free radicals formed (Sarica *et al*, 2007). This was confirmed by Shahid *et al* (2012) on the high percentage of effective antioxidants in *Morus alba* L leaves, the most important of which are phenols, flavonoids and ascorbic acid. Phenolic compounds may play a role in preventing the oxidation of unsaturated fatty acids present in sperm membranes and energy-forming regions within the mitochondria by interacting with free radicals (Desai *et al*, 2010 and Bansal and Bilaspuri, 2011). The concentration of Malondialdehyde in seminal plasma was reduced by the action of the active compounds (Avdatek, 2017 and Fayyad and Mahmood, 2019). In the current study, a concentration of 0.5% of Morus alba L leaf extract improved the mitochondrial activity of the sperm, and the semen preservation steps have a key role in disrupting the regulation of calcium ion levels due to a defect in the permeability of the mitochondrial membrane, which increases the calcium ion level in the cytoplasm and thus stimulates the work of Protease enzymes, endonucleases, phospholipases and ATPase that cause denaturation of proteins and break down lipids in the plasma membrane (Aman and Parks, 1994 and Aslanidi *et al*, 1997). From the results of this study, it was found that lower concentrations led to better results for the studied characteristics of the cooled semen of Awassi rams during a different preservation period.

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